Database Software Infrastructure Projects Report

Projects in CEPA/APS/DBS

January 28, 2003

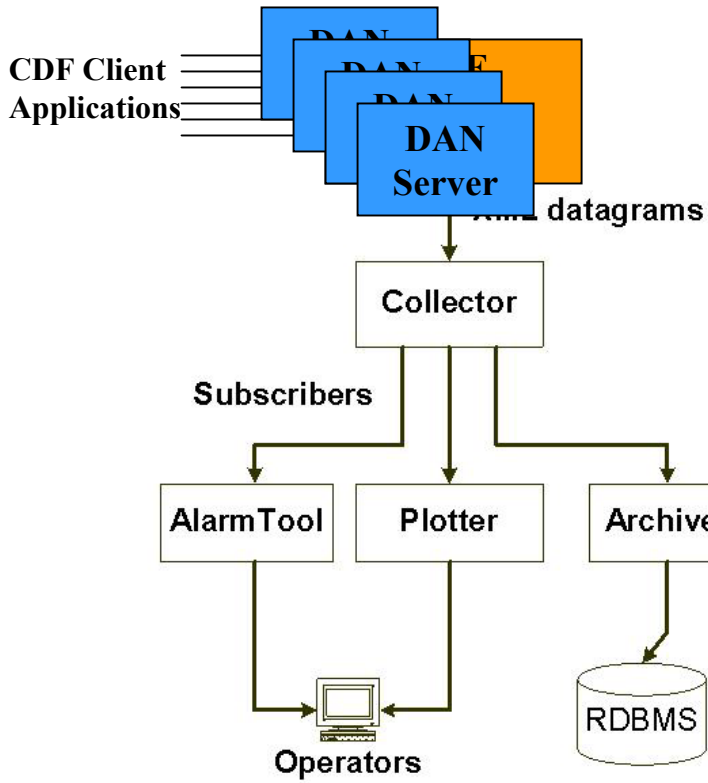
Overview

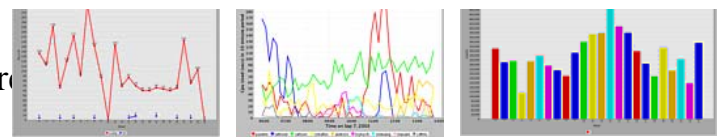
1. Common Monitoring –Complete, in maint. Phase–0.2 FTE
2. SAMGrid Monitoring pilot – Initial Phase Completed
3. Monitoring Phase II: dynamic content – 0.25 FTE
4. Ongoing CDF and D0 DB app. support – 1 FTE
5. froNtier - 1 FTE
6. CMS detector database pilot - 1 FTE
7. MINOS Support – 0.5 FTE (Dennis)
8. BLASTMAN - Accelerator and Technical Divisions Magnet DB – 0.5 FTE (Dennis)

Common Monitoring: DBSMon

Yuyi Guo, Jim Kowalkowski, Lee Lueking, Steve White , Eric Wicklund

- Project Goal: Common tools for Application Monitoring
- Information Generation (InfoGen) is Exp. Specific.
- Collector/Parser
- Archiver using MySQL Repository
- Plotting tools using JavaFreeChart
- Histogramming part uses JAIDA
- Admin and automation scripts

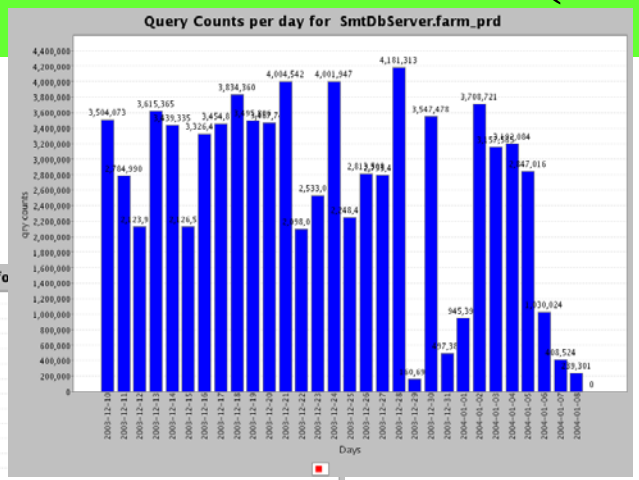


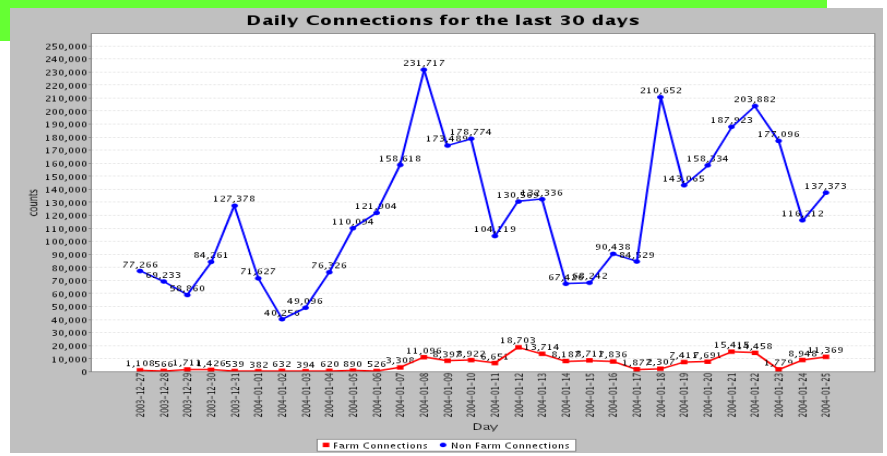


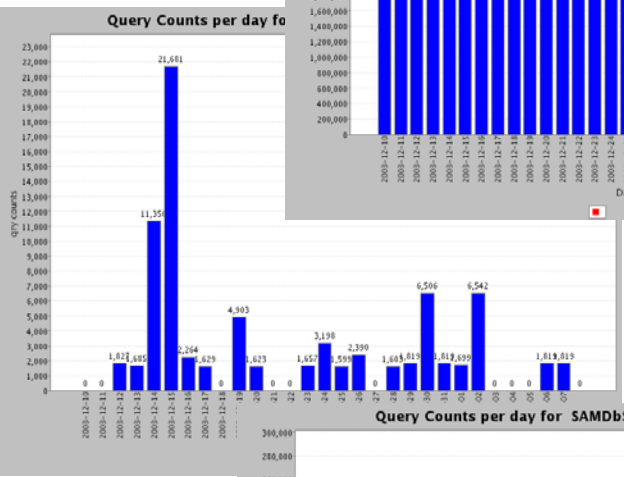
DBSMon

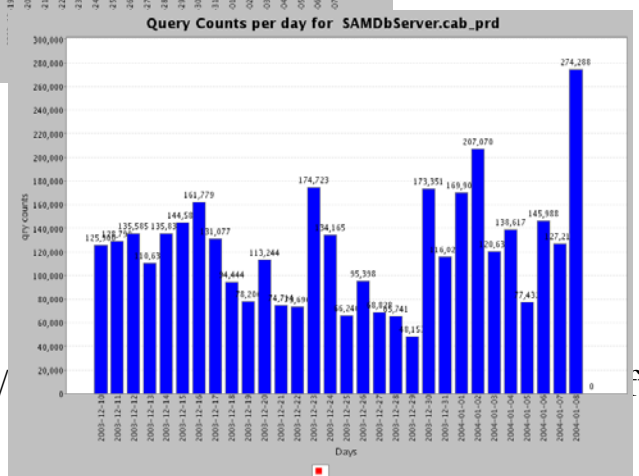
- "Last 24 hours" status plots for CDF and D0 DB operations are in place.
  - CDF includes client stats for farm and general users (16 plots).
  - D0 includes DAN calibration serving for farm (44 plots) and general users (44 plots).
  - Also monitors SAM db server usage. D0 in place (27 plots), CDF when dbserver upgrades are finished.
- Monthly summaries of daily operation.
- Documentation for the project is completed (available from dbsmon page)
- Project is finished, moving into maintenance phase.
- Dbsmon page is: http://dbsmon.fnal.gov

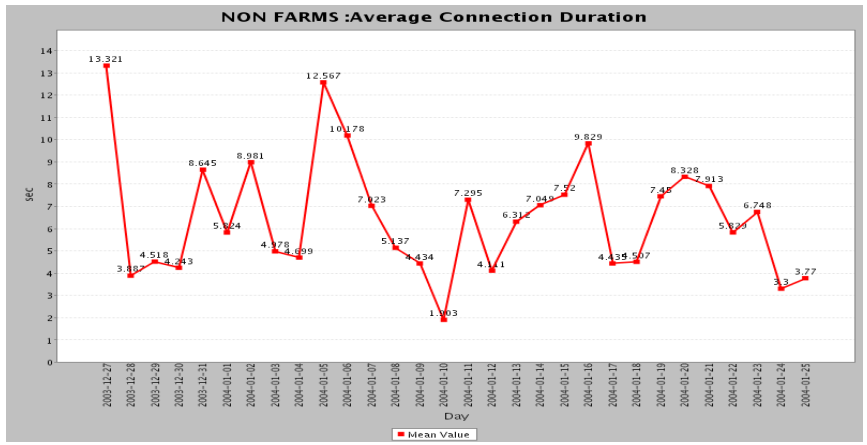
DBSMon (Summary plots)







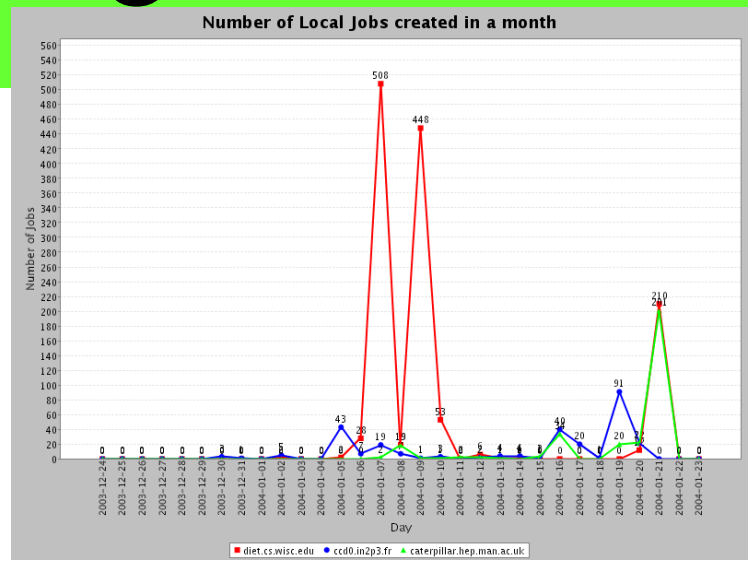


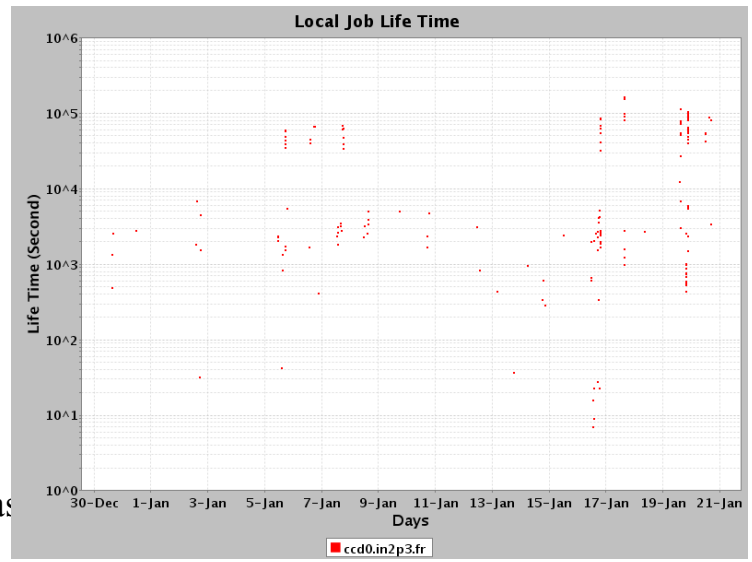


SAMGrid Monitoring Pilot

Yuyi Guo

- Using tools from DBSMon project to build example of monitoring for SAMGrid
- Mines information from XML databases at each JIM site using XML-RPC.
- Archives information into central MySQL database.
- Generates summary plots of SAMGrid activity.
- XML databases at each site still not very stable, schema evolving.
- http://dbsmon.fnal.gov





Monitoring Phase II

- Extending what we have built in DBSMon project.
- Providing dynamic monitoring pages using JSP (or PHP where useful).
- Access to historical plots and ability to do custom queries.
- Ties in nicely to the experience gained with Tomcat in the froNtier project.
- Requested by both CDF and D0 in the past.

Ongoing CDF and D0

- CDF (0.5 FTE) Dennis, Eric, Margherita
  - **Codegen for ODBC to have common DB access API. Improves maintainability and extensibility of DB access code.**
  - **Several items in calibration task list.**
  - **Ongoing support of existing CDF database system including calib manager, slow controls, ICICLE. Monitoring database load and exceptional users.**
- D0 (0.5 FTE) Steve, Lee
  - **Support for calibration schema management. Maintenance of client and dbserverGen code.**
  - **Ongoing support for DAN product. Help with testing and deployment of DAN to remote sites.**
  - **Help with trigger DB server as needed, like possible upgrading from FNORB to OmniORB.py.**
  - **Consulting for luminosity DB project (D0 requested 0.2 FTE through summer)**

FroNtier

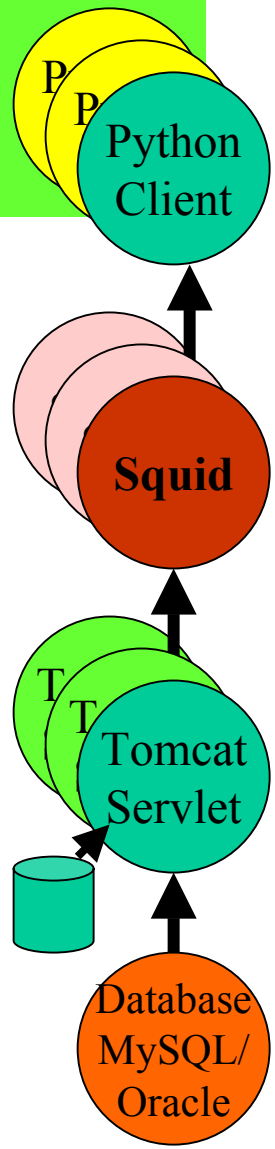
CDF: Barry Blumenfeld (JHU) , Dmitri Litvintsev, Petar Maksimovic (L)(JHU) , Mark Mathis(JHU), CD/APS: Dennis Box, Chih-Hao Huang, Jim Kowalkowski, Lee Lueking (L), Marc Paterno, Steve White.

- **Goal: Assemble a toolkit, using standard web technologies, to provide high performance, scalable, database access through a multi-tier architecture.**
- **Pilot project known as Ntier tested the technology:**
  - **Tomcat: multi-threaded servlets, DB connection pool management,**
  - **HTTP: standard client server protocol**
  - **Squid: distributed proxy caching service**
  - **NetLogger: client monitoring**
- **FronTier project is building a working system for CDF vertical slice test with all needed components ready by March 1, 2004. Additional features needed for production will be ready in June 2004.**
- **Also proposing to use froNtier approach for D0 Lum DB, and CMS detector DB project, contingent on CDF success.**
- **http://whcdf03.fnal.gov/ntier-wiki/FrontPage**

FroNtier

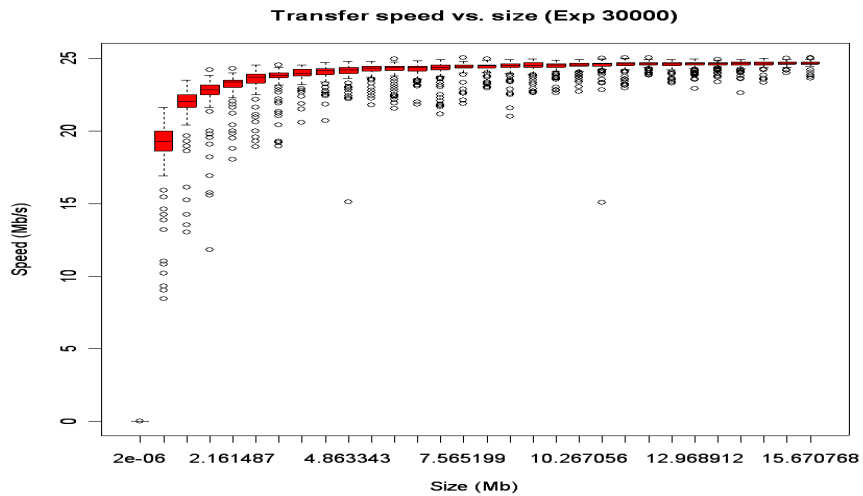
- **Ntier evaluation roadmap**

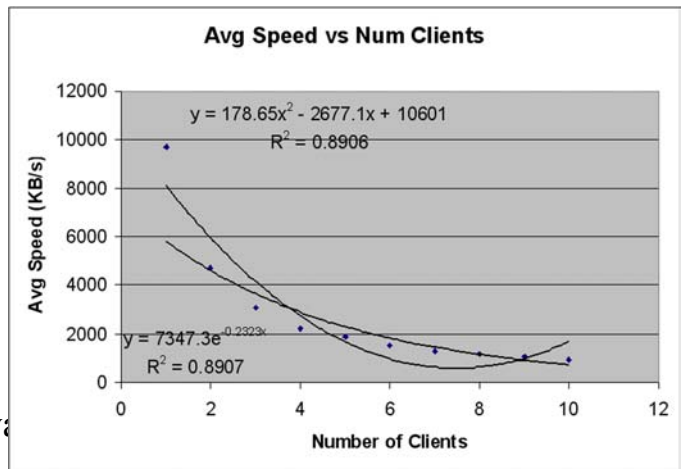
1. Measure throughput for single client, data cached in server memory, various sized wads of data. Use pox.fnal.gov, castor.jhu.edu, pollux.jhu.edu
2. Measure throughput for multiple clients, data cached in server memory, various sized wads of data. Use castor.jhu.edu, pox.fnal.gov, cdf test caf as clients.
3. Repeat 1. and 2. with squid caching between server and client.
4. Add JDBC and connection pooling. Repeat tests for functionality,and reliability. Add squid caching.
5. Vertical slice test to provide SvxBeamPosition table information to CDF C++ clients.
6. Explore more complex configurations of Tomcat and Squid.



froNtier (results)

- Data throughput for single cleint.
- Data throughput for N condorCAF clients.
- Studying Squid performance now.





froNtier(client interface: SvxBeamPosition example)

- Client request:
  `http://cdfdb?cid=36&table=SvxBeamPosition`
- Server response:

```
<response>
  <metadata> <table>SvxBeamPosition</table>
  <id>36</> <columns> x y ... </columns>
  <types> double double ...</types>
  </metadata> <data>base64encoded...</data>
</response>
```

CMS Pilot

Dennis,Yuyi, Lee, Suichi Kunori + other CMS people

- Overview: Provide database designs and implementations for 1) construction, 2) equipment, 3) configuration, and 4) conditions (a.k.a. calibration) DBs for CMS HCAL, EMU, PIXEL, and ECAL detectors.
- Plan to have draft of initial design, schemas, and example tools ready for discussion March 1, 2004.
- Requirements and Use Cases for vertical slice test (Spring 2004) are in development. Detector DB requirements to meet other CMS milestones still need to be understood.
- Initial example of HCAL conditions database was produced by HCAL group last summer. We will begin by proposing Run II schemas and experience as starting point for other detectors.

Major Concerns

- We are keeping up with CDF and D0, but additional work is needed for CDF calibration task list, and D0 lum DB project.
- froNtier, although moving ahead nicely, needs additional effort to do testing and establish deployment strategies.
- The CMS project needs to accelerate quickly to achieve goals (still unclear) for vertical slice test, and beyond.
- Beams DB is moving toward success (as Dennis will report), but has taken away one developer from CDF, CMS, and froNtier. FNAL Alignment Group has requested similar project to update their database needs.